

FCF_{5,000}

FCF_{9,000}

FCF_{12,000}

FCF_{16,000}

MARINE AIR CONDITIONER
Installation & Operation Manual

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INTRODUCTION

Thank you for your purchase. No matter which of the following features was the reason for your purchase, we are sure it will meet your needs and provide many years of efficient and trouble free use. The FCF Series air conditioners are designed for marine applications incorporating the following features:

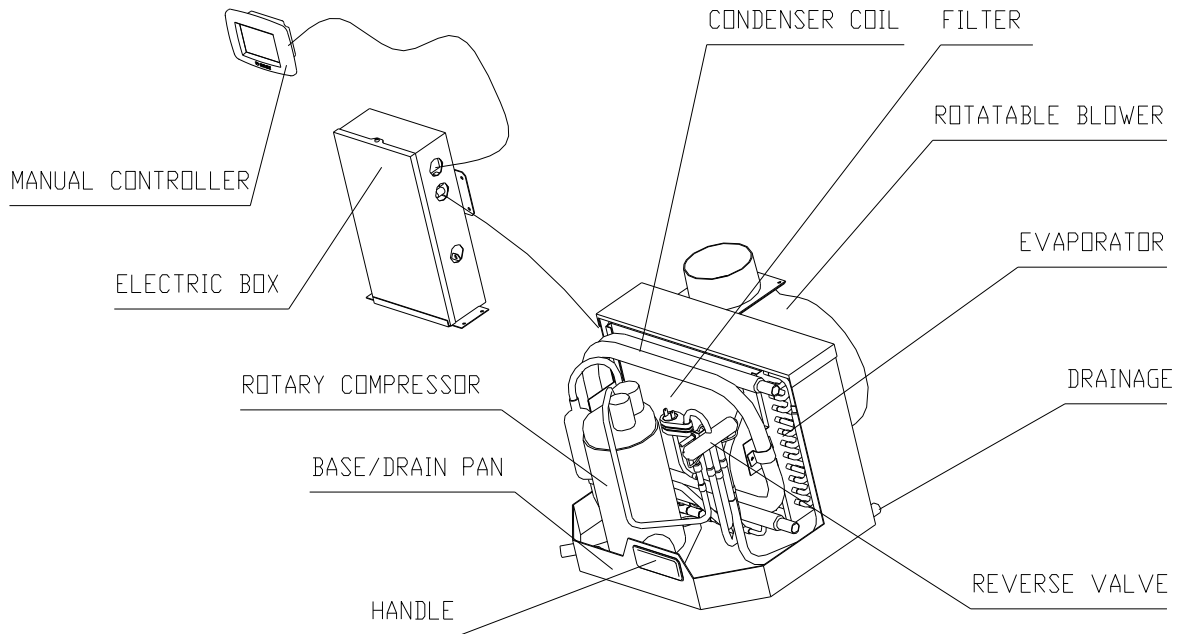
- Compact design
- High efficiency rotary compressors (5-16K)
- Cupronickel condenser coil
- Raised lance fin designed evaporator coil
- Polyester coated 2" (50mm) deep drain pan with two condensate drain locations
- Anti-vibration base pan
- Pre-charged and pre-wired systems for easy connections
- 3 speed blower motor. This eliminates all harmonic sounds and rumbles.
- Rotatable blower assembly

The controller offers the most technologically advanced design specifically made for the unique requirements of marine air conditioning. The controller has been designed with the following "user friendly" features:

- Non-volatile memory
- Low voltage display panel
- LED cabin temperature displayed in Fahrenheit or Celsius
- Multiple fan speed selections
- Compressor pressure fail safe protection
- Moisture mode cycle for humidity control

This manual is intended to provide the information necessary to ensure proper installation, operation, and maintenance of the unit. Improper installation can result in unsatisfactory performance and/or premature failure of the unit. Before proceeding, please read this manual completely. In the interest of product improvement, specifications and design are subject to change without prior notice.

OVERVIEW



HOW IT WORKS

Your self-contained air conditioner consists of four main components and a refrigerant gas circulating through the system. The BLOWER draws warm cabin air across the fins on the EVAPORATOR where the heat from the air is transferred to the refrigerant in the evaporator coil. As the refrigerant evaporates from a liquid into a gas, it absorbs the heat from the cabin air. The COMPRESSOR then compresses the refrigerant gas and pumps it through the outer tube in the CONDENSER COIL. The seawater pump circulates cool seawater through the inner tube in the condenser coil; this cools the refrigerant and condenses it into a liquid. The heat from the refrigerant is exchanged to the seawater and discharged overboard. The liquid refrigerant is then passed through the EVAPORATOR COIL and the cycle repeats; removing heat from the cabin air lowering its temperature. The cooled air is blown through the ducting and out the supply air grille(s). For reverse cycle heating, the refrigerant flows in the opposite direction through the reversing valve. Heat is transferred from the seawater in the condenser coil to the refrigerant and then to the air blowing through the evaporator into the cabin. Seawater temperature will directly affect the a/c unit's efficiency. This a/c unit can effectively cool your boat in water temperatures up to 90°F and heat in water temperatures as low as 40°F.

INSTALLATION





UNPACKING AND INSPECTION


When the equipment is received, all items should be carefully checked against the packing list to ensure all cartons have been received. Move units in the normal "up" orientation as indicated by the arrows on each carton. Examine cartons for shipping damage, removing the units from the cartons if necessary. If the unit is damaged, the carrier should make the proper notation on the delivery receipt acknowledging the damage.


SAFETY CONSIDERATIONS


VERY IMPORTANT: Never install your air conditioner in the bilge or engine room areas. Ensure that the selected location is sealed from direct access to bilge and/or engine room vapors. Do not terminate condensate drain line within three 3' (914mm) of any outlet of engine, generator exhaust system, compartment housing an engine or generator, or in a bilge, unless the drain is connected properly to a sealed condensate or shower sump pump. Seal all cabin sole penetrations around condensate hoses to eliminate harmful bilge fumes in the cabin living spaces.


Installation and servicing of this system can be hazardous due to system pressure and electrical components. When working on this equipment, always observe precautions described in the literature, tags and labels attached to the unit. Follow all safety precautions. Wear safety glasses and work gloves and place a fire extinguisher close to the work area. The following is a summary of the labels on the unit:

	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
	Special note. Make sure to read before proceeding.

 Electrical shock hazard. Disconnect voltage at main panel or power source before opening any cover. Failure to comply may result in injury or death.

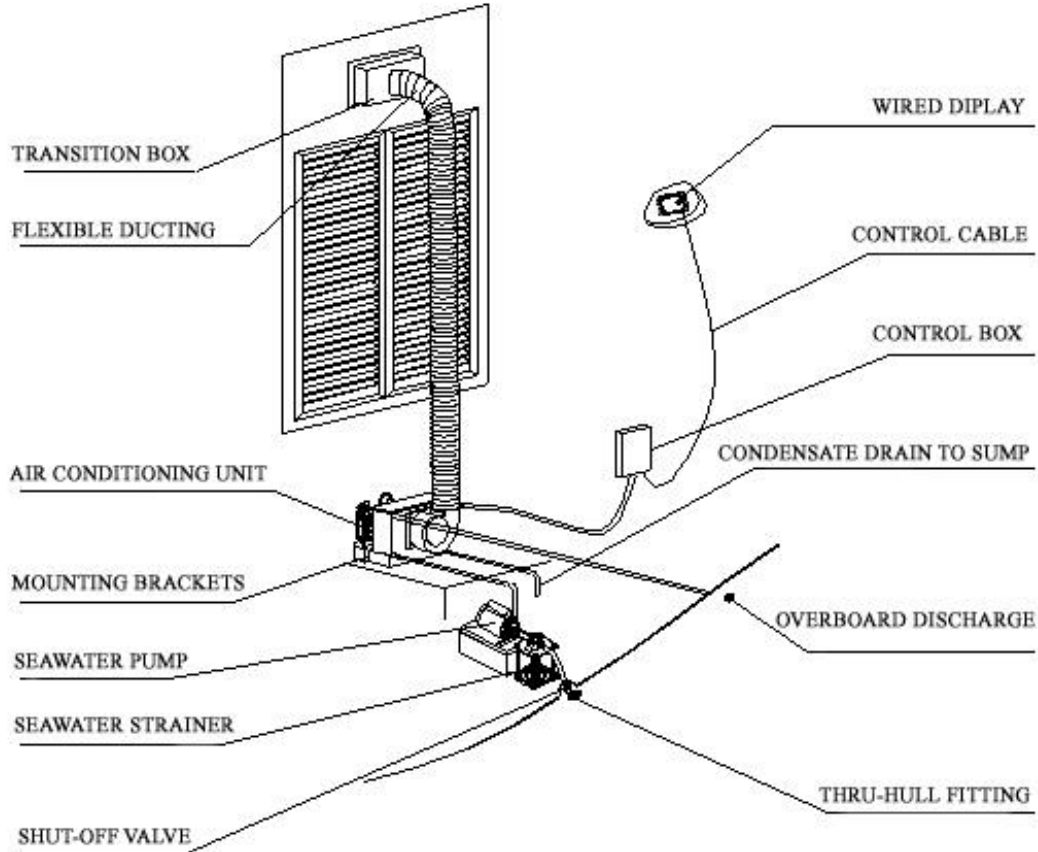
 This unit cannot and should not be mounted in spaces containing gasoline engines, tanks, LPG/CPG cylinders, regulators, valves or fuel line fittings. Failure to follow this warning could result in injury or death and violation of federal requirements for ignition protection.

 Notice this component is charged with Hydro chlorofluorocarbon (H CFC) refrigerant R22. Effective July 1, 1992, it shall be unlawful for any person to knowingly vent or otherwise knowingly release any class 1 (CFC) or class 2 (H CFC) substance as a refrigerant in a manner which permits such substance to enter the atmosphere per the clean air act of 1990. Public law 101-549 title IV section 608-c. Failure to comply may result in severe penalties, including fines and imprisonment.

 To minimize the hazard of electrical shock, this component must be effectively grounded. High compressor temperature is normal. Do not touch.

PLACEMENT OF SYSTEM

Selecting a good location for your air conditioner is the most important part of your preparation. Be sure to consider the size of the area you are cooling, the air distribution needs, and the size of the unit you have chosen. Keeping in mind that cool air has a tendency to fall; it is highly recommended that you locate the supply air grille as high as possible in the cabin. See diagram below.



The unit should be installed as low as possible, **BUT NEVER IN THE BILGE OR ENGINE ROOM AREAS, ENSURE THAT THE SELECTED LOCATION IS SEALED FROM DIRECT ACCESS TO BILGE AND/OR ENGINE ROOM VAPORS.** Installing the unit as low as possible (such as under a V-berth, dinette seat or bottom of a locker) and ducting the supply air as high as possible, creates an ideal airflow condition. This type of installation will prevent short or premature cycling.

The unit should be positioned on a firm, level, horizontal surface and the condensate drain line should run downward from the unit to a suitable drain location. Plan all Connections, which must be made including ducting, condensate drain, and seawater in and out, electrical power connections, location of control, and seawater pump placement, to assure easy access for routing and servicing.

Tools required:

- Screws drivers
- Pliers
- Pipe wrench
- Wire cutters / crimpers
- Drill & 7/8" bit
- Jigsaw
- Duct tape
- Electrical tape
- Teflon tape
- Bedding compound to seal thru hull fittings
- Hardware to secure unit, pump, strainer, grilles & control panel

CONDENSATE DRAINS

The condensate drain pan is 2" (50mm) high with two drain locations. During conditions of high humidity, condensate may be produced at a rate of approximately a 1/2 gallon per hour (1.9 liters per hour). With this in mind, it is important to route condensate drains downward to a sump pump. It is not recommended to route condensate drains to the bilge. After the condensate drain installation is complete, test the installation by pouring water into the pan and checking for proper flow.

For installation of the condensate drain:

- Attach a 5/8" I.D. reinforced hose to the hose barb and secure with stainless steel hose clamps.
- Install the condensate drain hose downhill from the unit and aft to a sump.
- Two drain fittings may be used and the hoses (teed) together using a tee fitting provided there is a minimum 2" drop from the bottom of the base pan to the tee connection.



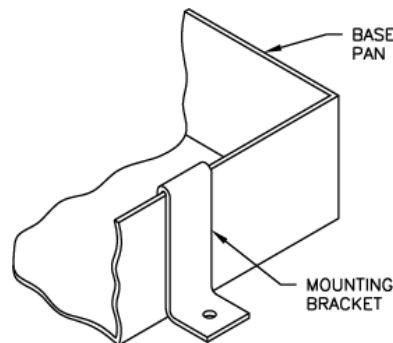
Do not terminate condensate drain line within three 3' (914mm) of any outlet of engine, generator exhaust systems, compartment housing an engine or generator, nor in a bilge, unless the drain is connected properly to a sealed condensate or shower sump pump. Seal all condensate hose penetrations.

BLOWER ASSEMBLY

You can achieve multi-directional supply air discharge from a single unit by rotating the blower to the desired position. It is ideal for tight installations as 180° of rotation is available with which to position the blower. Its advanced design allows the blower to be easily removed for rotating or servicing by removing 4 screws. Rotate the blower to allow the most direct flow of air to the supply air grille.

MOUNTING BRACKETS

The a/c unit is supplied with a base pan that also serves as a condensate pan. Mounting clip brackets (4) are provided to secure the base pan to a flat, horizontal surface.



SUPPLY & RETURN AIR GRILLES AND TRANSITION BOXES

Install the supply air grille as high as possible in a location that will provide uniform air distribution throughout the cabin. Grille louvers should be directed upward. The return air grille should be installed as low and close to the a/c unit as possible to ensure direct uninterrupted airflow to the evaporator. The return air grille should have a minimum four inches (4") of clearance in front of it, free from any furniture or other obstructions. In no instance should a supply air discharge be directed towards a return air grille, as this will cause the system to short cycle. Allow for adequate clearance behind the supply air grille(s) for the transition box and ducting connection. See the MAINTENANCE section of this manual for return air filter cleaning instructions.

DUCTING

Good airflow is critical for the performance of the entire system. It is highly dependent on the quality of the ducting installation. The ducting should be run as straight, smooth and taut as possible minimizing the number of 90° bends (two tight 90° bends can reduce airflow by 25%). If a transition box is used, the total area of supply air ducts going out of the box should at least equal the area of the supply duct feeding the box. To calculate the square inch area of a round duct, multiply the radius by itself (r^2) and multiply that number by 3.1416(π). The following is a summary of proper ducting connections:

1. Pull back the fiberglass insulation exposing the inner Mylar duct hose.
2. Slide the Mylar duct hose around the mount ring until it bottoms out.
3. Screw 3 or 4 stainless steel sheet metal screws through the duct hose into the transition ring. Make sure to catch the wire in the duct hose with the heads of the screws. Use finish washers with the screws if necessary. Do not use band clamps, as the hose will slide off.
4. Wrap duct tape around the ducting and ring joint to prevent any air leaks.
5. Pull the insulation back up over the Mylar to the ring and tape this joint.
6. Remove excess ducting and use the same connection method at the supply air grille.

All ducting should:

- Be appropriately sized for each application.
- Run as smoothly and taut as possible.
- Have as few bends or loops as possible.
- Be securely fastened to prevent sagging or chafing during vessel operation.
- Have all excess ducting lengths trimmed off.
- Not be flattened or kinked.
- Insulated when located in high heat load areas (hull side, mechanical compartments, etc.).
- Be properly protected against potential damage when routed through open areas or bulkheads.

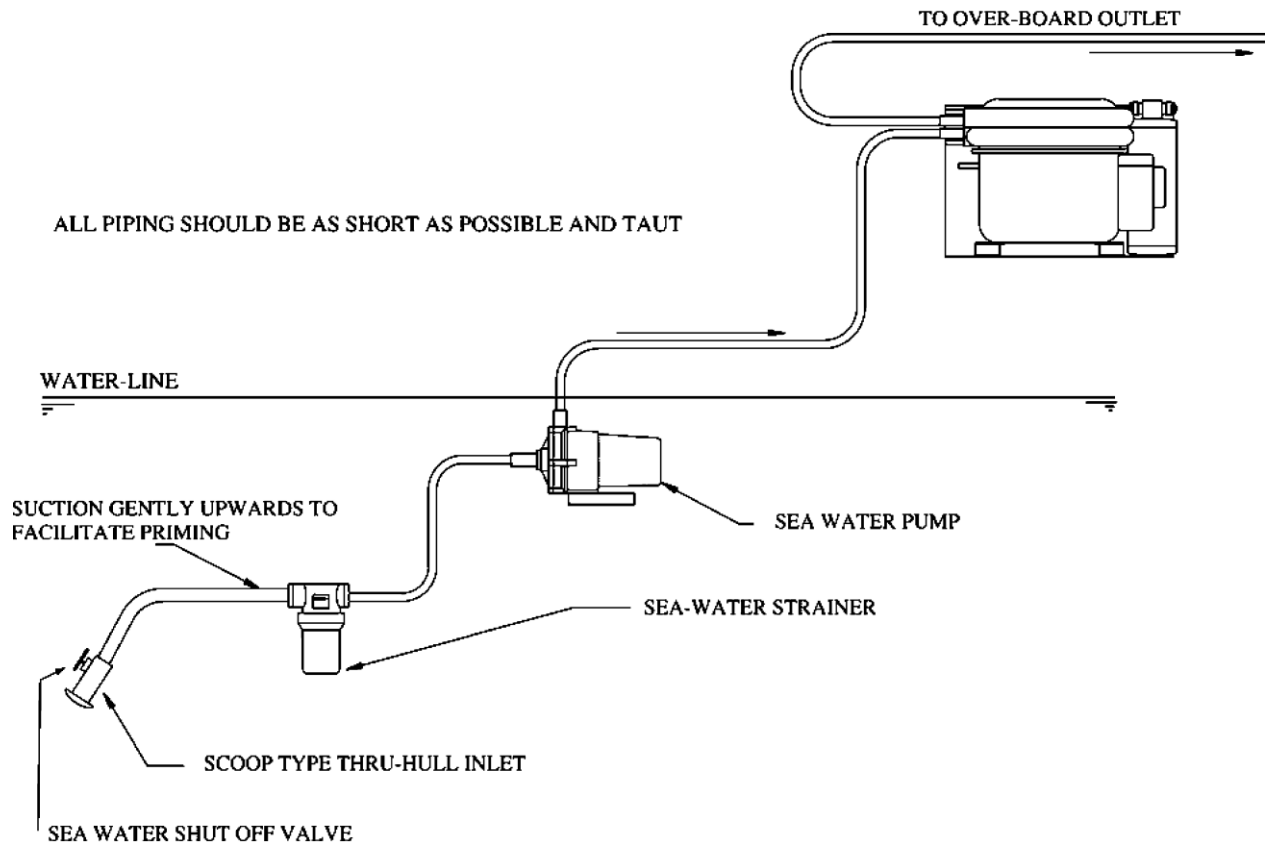
SEAWATER PUMP AND PLUMBING

Several guidelines are required during the installation of the seawater system. Since the circulation pump is centrifugal, not self-priming, it must be mounted so that it is always at least 1' (305mm) below the water line regardless of which tack the vessel is on. Pump may be mounted horizontally or vertically, however, the discharge must always be above the inlet. Pump head should be rotated toward the direction of water flow. **Install the seawater speed scoop intake as far below the water line and as close to the keel as possible in any application, but especially on a sailboat, to keep the intake in the water when the boat heels over so that air does not get into the system.** The speed scoop intake must face forward and not be shared with any other pump. A seawater strainer is mandatory between the shut off valve (seacock) and the pump to protect the pump from any foreign matter. Failure to install a seawater strainer will void the pump warranty. The seawater system should be installed with an upward incline from the speed scoop & seacock, through the strainer, to the inlet of the pump, next to the inlet of the a/c unit's condenser coil. The discharge from the a/c unit should run to the seawater outlet thru-hull fitting that should be located where it can be visually inspected for water flow as close to the waterline to reduce noise. Hose connections must be secured using double/reversed stainless steel hose clamps. Use Teflon

tape on all threaded connections.

Summary of the seawater system installation:

1. Install the speed scoop thru-hull inlet as close to the keel and as far below the water line as possible, facing forward. Bed the scoop with a marine sealant designed for underwater use.
2. Install a bronze, full flow seacock on the speed scoop thru-hull inlet.
3. Install a seawater strainer below the level of the pump with access to filter.
4. Mount the pump above the strainer and at least 1' (305mm) below the waterline.
5. Connect the seacock and strainer with an uphill run of 5/8" reinforced marine grade hose.
6. Connect the discharge from the pump uphill to the bottom inlet of the a/c unit's condenser coil with 5/8" hose. Connect the discharge from the condenser coil to the overboard discharge thru-hull fitting with 5/8" hose.
7. Avoid loops, high spots or the use of 90° elbows with seawater hose (each 90° elbow is equivalent to 2.5' (762mm) of hose and a 90° elbow on the pump outlet is equivalent to 20' (6.1m) of hose).
8. Double clamp all hose connections with stainless steel clamps, reversing the clamps.
9. Use Teflon tape on all threaded connections.
- 10. Connect all metallic parts in contact with seawater to the vessel's bonding system including the speed scoop inlet, strainer, pump and the air conditioner. Failure to do so will void warranty.**



ELECTRICAL CONNECTIONS, GROUNDING AND BONDING

All a/c units have a terminal strip mounted inside the electric box. The terminal strip is labeled for proper connections of the electrical supply, ground wires and pump circuits. A wiring diagram is provided in the electrical box and later in this manual. The wiring diagram in the electrical box supersedes any found in this manual and ABYC standards. The correct size circuit breaker should be used to protect the system as specified on the a/c unit's data plate label. A minimum of 12 AWG boat cable should be used to supply power to the a/c unit and the seawater pump. All connections shall be made with ring or fork terminals. **Turn off a/c power supply circuit breaker before opening electric box.**

Each a/c unit installed requires its own dedicated circuit breaker. If there is only one a/c unit installed, the seawater pump does not require a circuit breaker; the wiring from the seawater pump is connected to the terminal strip in the electric box. If two or more a/c units use the same seawater pump, the pump wires will be connected to a pump relay, Please refer to the wiring diagram. Electrical connections in the bilge and/or below the waterline should use heat shrink type butt splices. Field wiring must comply with ABYC electrical codes. Power to the unit must be within the operating voltage range indicated on the data plate. Properly sized fuses or HACR circuit breakers must be installed for circuit protection. See data plate for maximum fuse/circuit breaker size (MFS) and minimum circuit amperage (MCA). All units must be effectively grounded to minimize the hazard of electrical shock and personal injury. The following can be observed: AC (alternating current) grounding (green wire) must be provided with the AC power conductors and connected to the ground terminal (marked "GRND") at the AC power input terminal block of the unit(s), per ABYC standard E-8, or equivalent.

1. Connections between the vessel's AC system grounding conductor (green wire) and the vessel's DC (Direct Current) negative or bonding system should be made as part of the vessel's wiring, per ABYC standard E-9, or equivalent.
 - When servicing or replacing existing equipment that contains a chassis-mounted ground stud, the installer must check the vessel's wiring for the existence of the connection required in item 1 above.



The a/c unit must be connected to the ship's bonding system to prevent corrosion due to stray electrical current or voltage. All pumps, metallic valves and fittings in the seawater circuit that are isolated from the a/c unit by PVC or rubber hoses must be individually bonded to the vessels bonding system also. This will help eliminate any possibility of corrosion due to stray current or voltage.

3 PHASE NOTICE

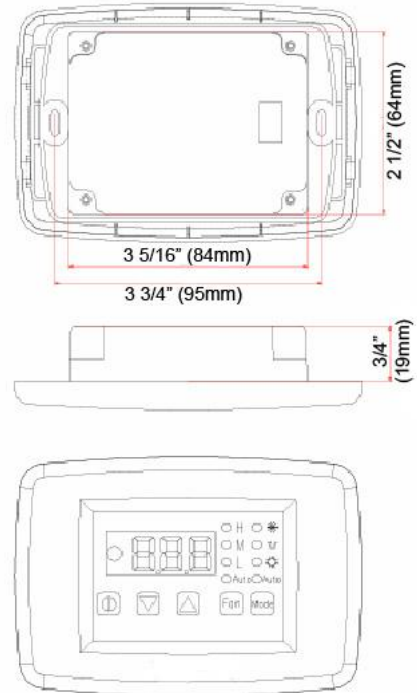
It is extremely important to ensure that wiring and phase sequencing of a three-phase power source is correct. Marine wiring standards call for power source phases L1, L2, and L3 to be color-coded BLACK, WHITE, and RED, respectively. These must be connected to the unit with the proper sequence; otherwise, it will not operate properly. If the wiring sequence is incorrect, the unit's compressor (Scroll type only) and pump (if applicable) will run in the reverse direction at a significantly increased noise level.

WIRED REMOTE CONTROLLER INSTALLATION



DO NOT turn the unit off and immediately turn it back on. Wait at least 30 seconds for refrigerant pressures to stabilize.

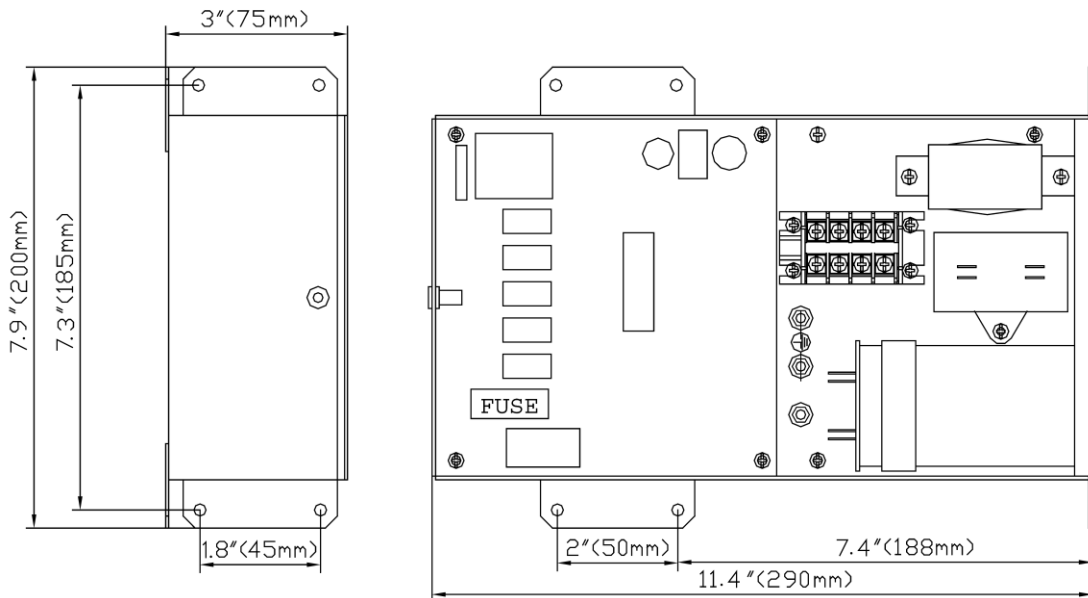
Before mounting the wired display, consider the location. The display panel should be mounted on an inside wall, slightly higher than mid-height of the cabin. The cut out size for the display panel is 2 1/2" (64mm) wide by 3 5/16" (84mm). Do not mount the display in direct sunlight, near any heat producing appliances or in a bulkhead where temperatures radiating from behind the panel may affect performance. Do not mount the display in the supply air stream. Do not mount the display above or below a supply or return air grille. Do not mount the display behind a door, in a corner, under a stairwell or any place where there is no freely circulating air. Mount the display within display cable length (custom lengths available) of the air conditioner. Plug the display cable into the circuit board in the electric box and into the back of the display panel.



CONTROL BOX INSTALLATION

Mount the control box using four M5 screws.

Mount the control box in a cool dry location leaving plenty of room for access.



INSTALLATION CHECKLIST (Review Prior To Installation)

Seawater cooling system:

- Speed scoop located as far below the water line and as close to the keel as possible
- Shut off valve (sea cock) and speed scoop properly sealed and tightened
- Seawater pump is at least 1' (305mm) below water line and securely mounted
- Strainer mounted below pump with access to filter
- Double/reversed stainless steel hose clamps on all hose connections
- Teflon tape on all threaded connections
- Hose runs uphill from speed scoop and sea cock to strainer, pump and a/c unit, then downhill (if possible) from a/c unit to overboard discharge
- Water flowing freely from overboard discharge while pump is running
- Pump relay panel, if used, must have its own circuit breaker sized for the pump (20 amp max)
- All metal fittings should be bonded

Mounting

- Not in engine room or bilge areas, must be sealed away from exhaust or fumes
- Proper spacing allowed around unit
- Attached to solid level platform with hold down brackets provided
- Condensate drain routed aft and down hill to a sealed sump (not bilge)
- All penetrations to bilge area sealed
- Blower rotated toward supply air grille

Electrical

- All butt connections on pumps are tightly crimped and covered with heat shrink
- AC power source installed and grounded/bonded in accordance with ABYC standards
- Control wires connected to terminal strip with fork or ring terminals
- Circuit breakers sized according to specifications on the data plate label
- Pump Relay Panel (if used) has a dedicated circuit breaker sized for the pump but not to exceed 20 amps maximum.

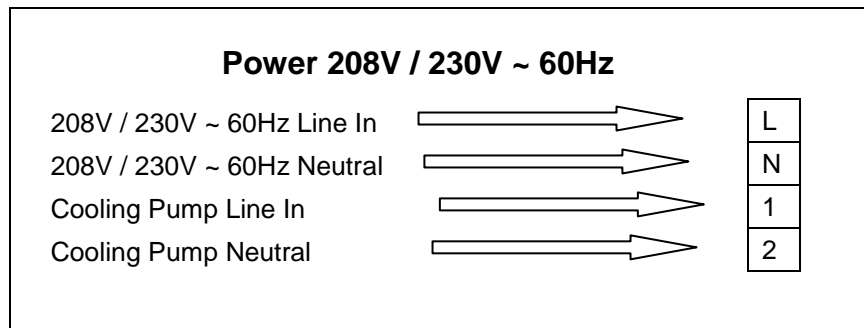
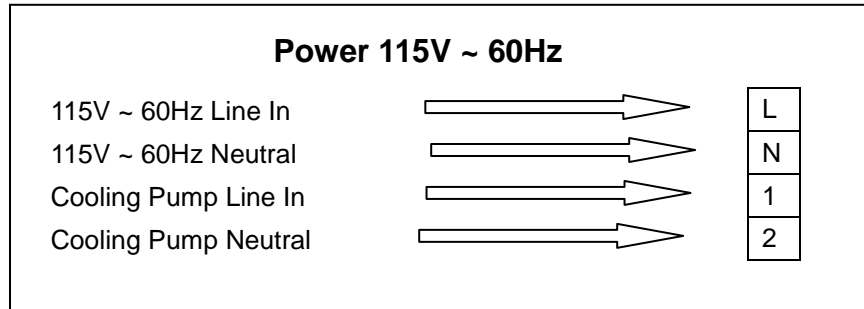
Grilles and Ducting

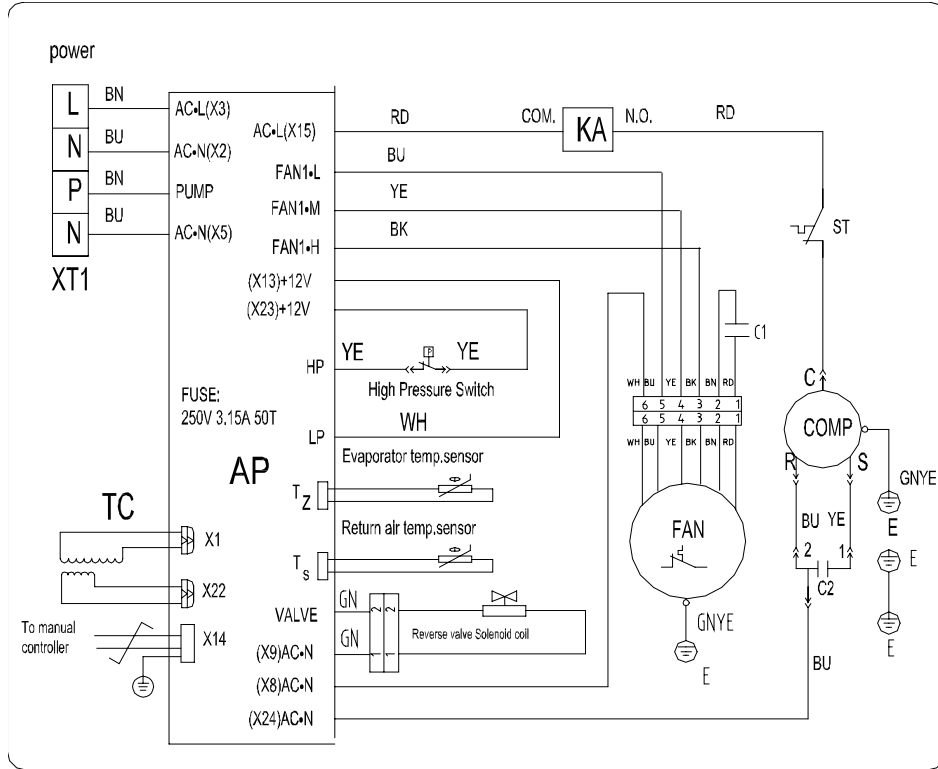
- Supply air grille mounted as high as possible
- Return air grille mounted as low and as close to the a/c unit as possible
- Return air grille mounted away from bilge vapors or exhaust fumes
- Ducting is pulled taut, straight, smooth and properly connected with no excess

Quick Start Operations Checklist

- Ensure seawater intake ball valve (sea cock) is open.
- Turn on the a/c circuit breaker. If the seawater pump has its own circuit breaker, make sure to turn it on.
- Turn the system on. Set the desired cabin temperature (set point).
- Check for a steady solid stream of water from the overboard discharge.
- Verify that there is steady airflow out of the supply air grille
- If the unit does not appear to be operating properly, refer to troubleshooting guidelines. Note: Do not turn the unit off and immediately turn it back on. Allow at least 30 seconds for refrigerant pressure equalization.

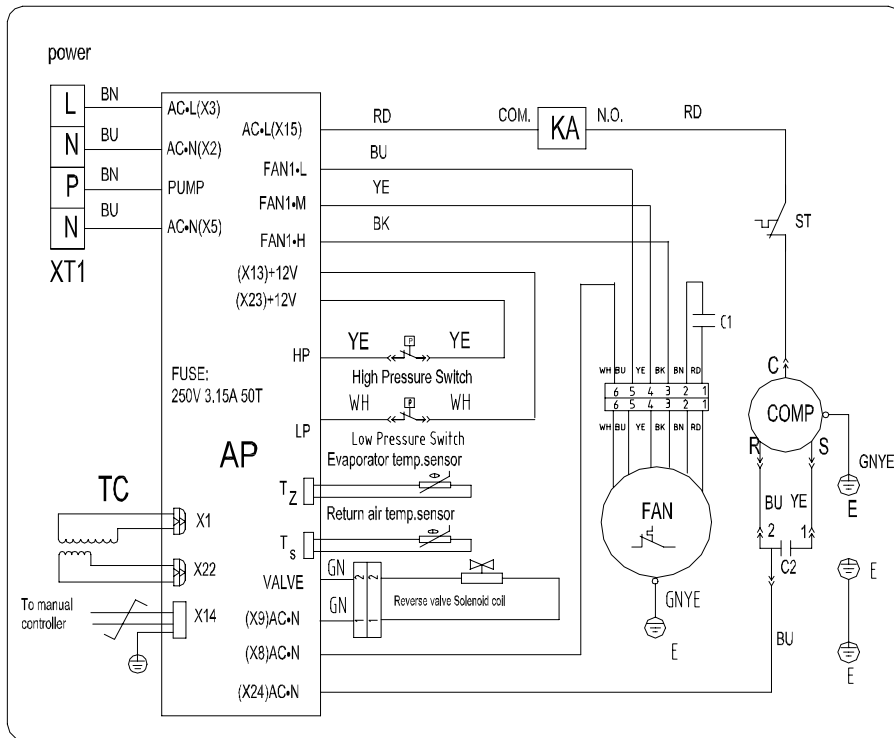
WIRING DIAGRAMS





Wiring Diagram FCF 5,000 (115v/230v) – FCF 9,000 (115v/230v)

(FCF 9,000 230v comes with a Panasonic Compressor; all other model are equip with Samsung Compressors)



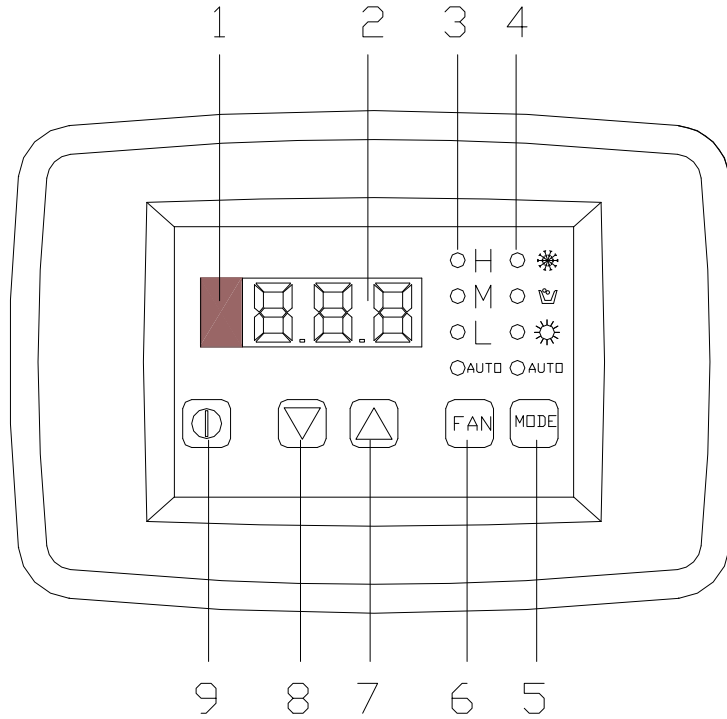
Wiring Diagram FCF 12,000 (115v/230v) – FCF 16,000 (115v/230v)

OPERATION

WIRED DISPLAY CONTROL OPERATION



- Don't install the wired display in a location where it can get wet.



- | | |
|--|--------------------------------------|
| 1. Display Receiver | 6. Fan Speed Button |
| 2. Digital Display | 7. Temp. Setting Button / Increasing |
| 3. Fan Speed Display (HIGH-MID-LOW and Auto Speed) | 8. Temp. Setting Button / Decreasing |
| 4. Display of Mode Operation (COOL-DEHUMIDIFY-HEAT and AUTO) | 9. On/Off Button |
| 5. Mode Button | |

This manual controller has memory function, if power off happened during the operation, the controller will memorize the status of ON/OFF, operation mode, set temperature, operation fan speed, temperature display format and time of starting interval. After powering on, the manual controller will display the setting status before power off / power loss; if the unit was turned on prior to the loss of power the units fan(s) will immediately turn on. After 1 minute the compressor will start and run in the status in which it was set prior to the power off / power loss.



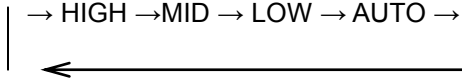
In cooling / heating / dehumidify modes, the pump starts before the compressor starts and stops 5 seconds after the compressor. This functionality is normal.

Power ON/OFF

- Press ON/OFF button to turn the unit on
- Pressing the ON/OFF button a second time will turn the unit off

FAN Control

- Press the FAN button, the fan speed will change in the following order:



- In “DEHUMIDIFY” mode, the fan will work at low speed automatically

Temperature Setting

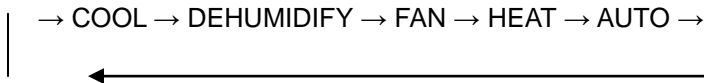
- Press temperature setting key
 - ▲ To increase in 1° increments
 - ▼ To decrease in 1° increments




- **The setting range of temperature in each mode:**

COOL	61°F 86°F or 16°C 30°C
DEHUMIDIFY	61°F 86°F or 16°C 30°C
HEAT	61°F 86°F or 16°C 30°C
FAN	In this mode, temperature cannot be changed.
AUTO	In this mode, temperature cannot be changed.

MODE Setting

- Press this key to change the operation mode in order of



- In “COOL” mode, the LED marked  will be illuminated if the set temperature is lower than room temperature. If set temperature is higher than room temperature, only the fan will run.
- In “Dehumidify” mode, the LED marked  will be illuminated and fan will work at low speed within a certain temperature range. Dehumidifying is more efficient than in cooling mode and it will save energy.
- In “FAN” mode, the room temperature will be displayed and the temperature cannot be set.
- In “HEAT” mode, the LED marked  will be illuminated when the set temperature is higher than the room temperature. When the setting temperature is lower than the room temperature, the will not run.
- In “AUTO” mode, the LED marked Auto will be illuminated and the room temperature will be displayed. The temperature cannot be set as the system will run automatically in the appropriate mode according to the contrast between room temperature and default temperature range 68°F - 80°F (20°C - 27°C).

Display Fahrenheit or Centigrade

Pressing the ▲ and ▼ key simultaneously, will switch between Fahrenheit Centigrade modes.

Error Codes

When there are faults within the system, an error code will be displayed on the display controller: Power off the unit and contact professional service.

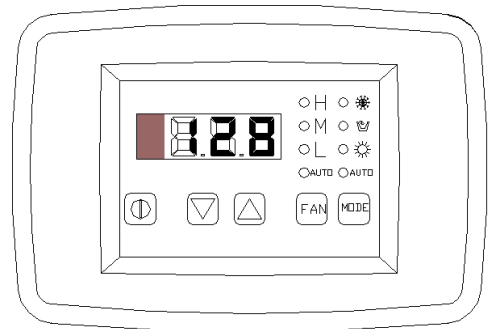
Error code	Description
E1	Compressor high pressure protection
E2	Evaporator freezing protection
E3	Compressor low pressure protection
E6	Communication error
F0	Ambient temperature sensor error
F1	Evaporator temperature sensor error

Key lock

- Press ▼ and FAN key simultaneously, all keys are locked. Press ▲ and FAN key simultaneously again, to unlock the keys.
- When keys are locked, the controller is locked out of system operation. “EE” will be displayed.
- The remote control will still operate as normal while in lock out mode.

Starting Interval Setting

- If there are several A/C units in a vessel, you should set starting time interval between units to avoid electrical system overload. (When a vessel is equipped with multiple FCF A/C units, a staged start up feature should be employed to protect the vessel's electrical system from heavy start – up power surges in the event of a power interruption. Depress the power switch at the manual controller to energize the unit. (When power is turned on using the manual controller and not in operation), immediately press the ▲ button and fan speed button simultaneously for 3 sec. The current setting will be displayed. Press the ▲ button and fan speed button again for 3 sec.; the starting interval setting can now be set. The digital display will begin flashing a number every 0.5sec. Simultaneously press the ▼ and ▲ buttons to change the setting. Once you have reached the desired time delay value, press the ▲ button and fan speed button simultaneously, to confirm the desired parameter. Pressing the ▲ button and fan button again simultaneously will exit the programming. The figure will flash 10s, and then the controller will exit from starting interval setting, the setting number is not available.) **NOTE:** This setting can only be changed once per power cycle. To change this setting again the power to the unit must first be cycled.
- The value displayed represents 20s. For example, a set value of 128 means that the actual setting interval time should be 128×20=2560s.



- When performing this setup or value change, ensure the wireless remote is not in site of any display as this could potentially change values prior to confirming set value. (Make sure to confirm new values by simultaneously holding the ▲ button and the fan speed button.)
- After the new values have been set, power the controllers off, and then back on. All settings will be set and ready for use after reboot.
- The setting range of starting interval value is 0-255; accordingly, the setting range of starting interval time is 0-5100s (85min).

Note: The starting interval time setting function only is available in the same vessel with two or more units installed. After the starting time interval is setup, and rebooted, Units will delay 3 min. This is called time of starting interval.

Auto –off function of the manual controller

The display of ambient temperature will automatically turn off if there is no operation from the manual controller within five minutes.

1. After receiving the signal from the manual controller, the indicator will light turn on, in which case, the unit will become operational.
 2. After receiving the signal from remote controller, the temperature will display on the manual controller, the indicator will turn on and the unit will become operational.
- After the unit stops, there is no display on the manual controller.
 - Powered on again if the unit status is on before power off, temperature indicator and mode indicator of the manual controller will illuminate automatically.
 - If the unit receives an off signal, both the temperature and indicator on light will turn off on the manual controller.

Accessories

	ITEM	QUANTITY
1	Mounting Bracket	4
2	Fuse	2
3	Remote controller	1
4	Battery	2

REMOTE CONTROL OPERATION



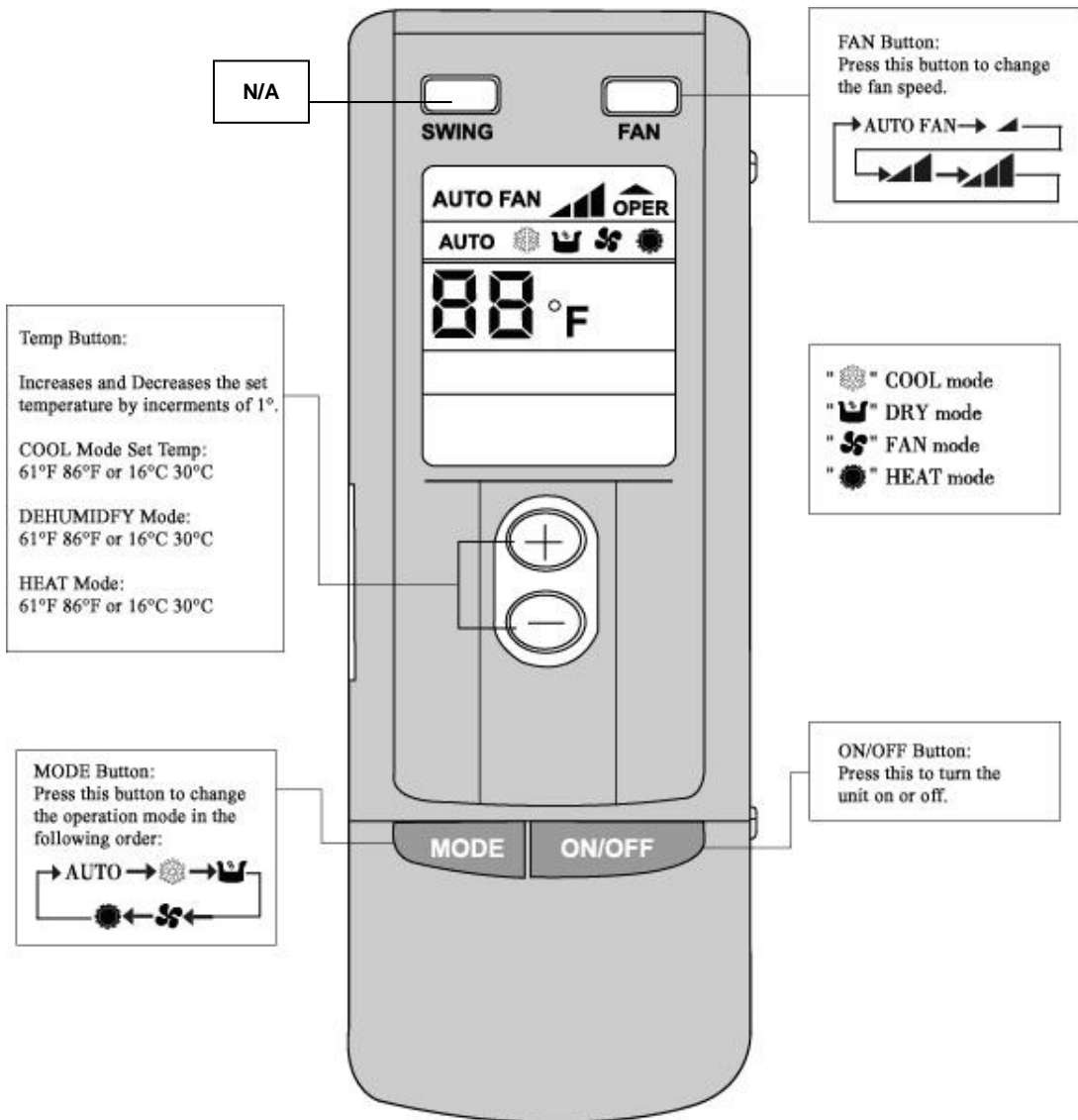
Be sure that there are no obstructions between the remote and controller.

- The remote control signal can be received up to a distance of 33' (10m).
- Don't drop or throw the remote control.
- Don't place the remote control in a location exposed to direct sunlight or high temperature.

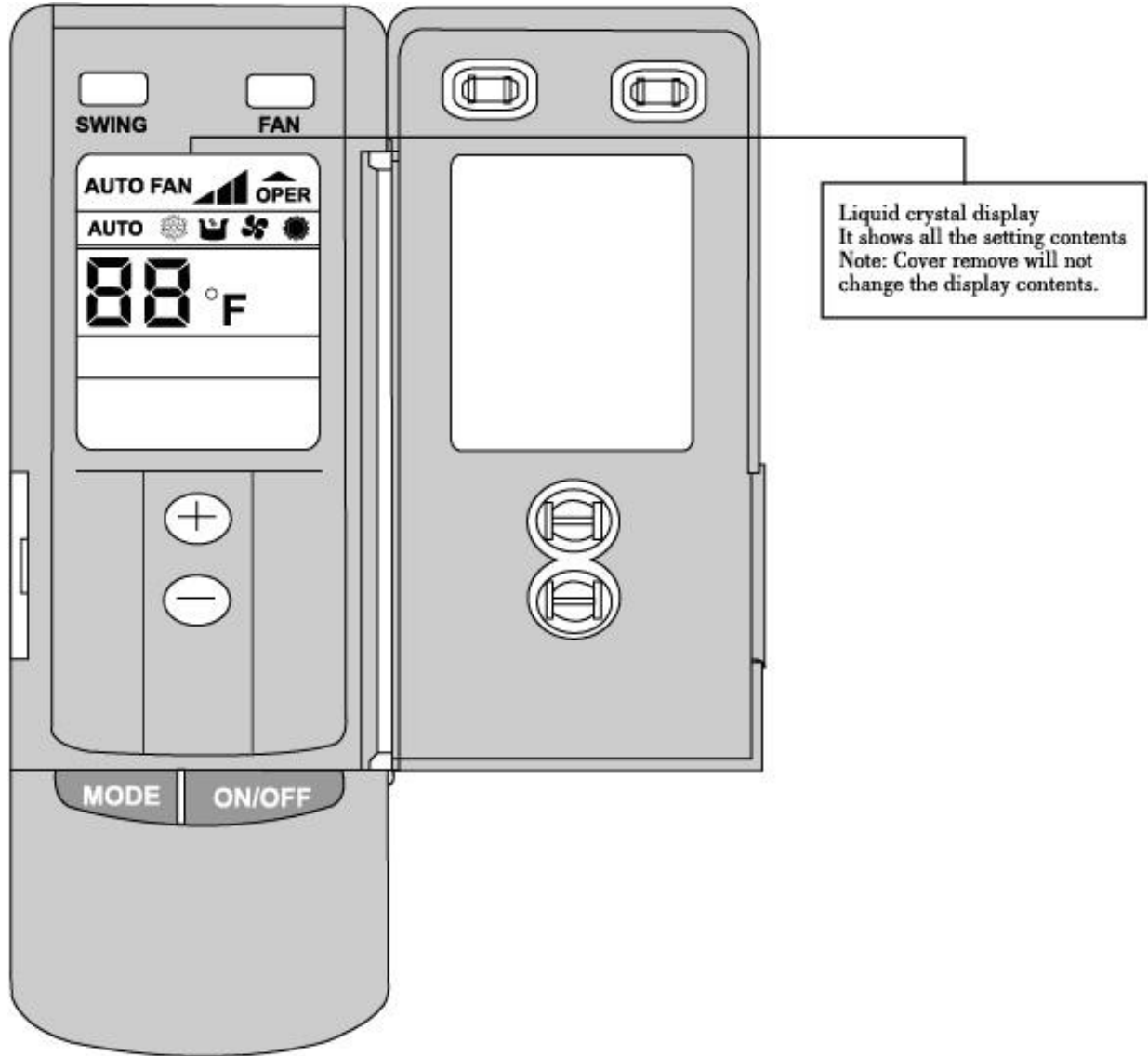


This remote control is universal. Some functions / buttons and display options may not apply to this AC unit.

Button / Function and Description (Cover Closed)



Button / Function and Description (Cover Open)



Mode Operations

COOL Mode Operation

- According to the difference between room temperature and set temperature, the microcomputer will decide if cooling mode is on or off.
- If room temperature is higher than set temperature, unit runs in cooling mode.
- If room temperature is lower than set temperature, the compressor stops and only the fan will run.
- Set temperature should be in range of 61°F to 86°F or 16°C to 30°C

HEAT Mode Operation

- If room temperature is lower than set temperature, the compressor runs in HEAT mode
- If room temperature is higher than set temperature, the compressor will shut off and the fan will run.
- Set temperature should be in range of 61°F to 86°F or 16°C to 30°C.

DEHUMIDIFY mode operation

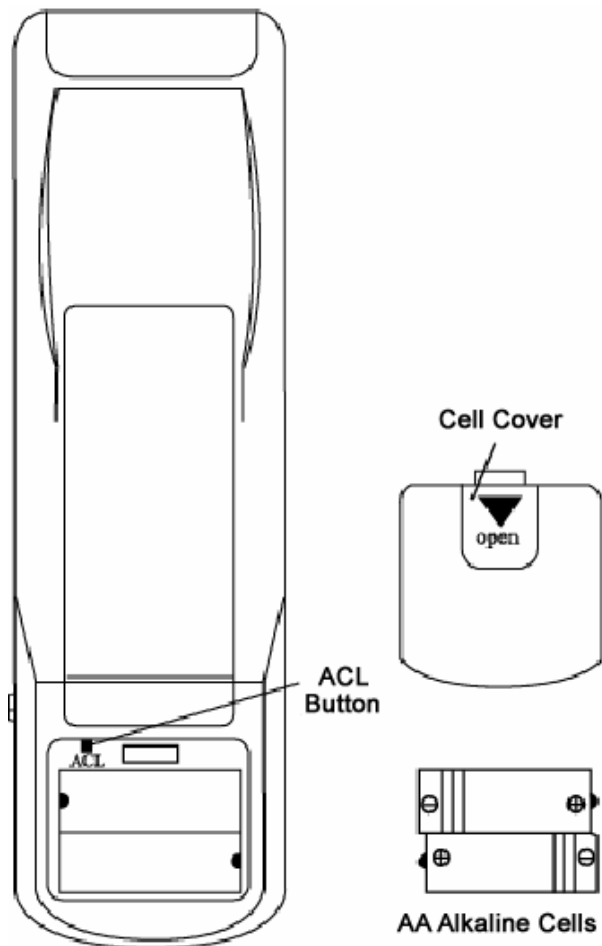
- In DEHUMIDIFY mode, if the indoor temperature is higher than temperature setting, the unit will operate in cooling mode and the fan will run on low speed
- Set temperature should be in range of 61°F 86°F or 16°C to 30°C

FAN mode operation procedure

- Temperature can not be set in this operation mode.

Battery Replacement in Wireless Remote Control

Wireless remote control battery requirements: Two AAA alkaline cells.



1. Slide the cell cover downward to take out the worn cells. Replace the worn cells. (Note to the correct polarity).
2. Close the cell cover.
3. The LCD will show all the functional figures and letter codes after the batteries are installed. Wait approximately 10 seconds for normal use.
4. The life span of batteries is approximately 1 year.(depending on usage)
5. If the wireless remote control will not be used for an extended period of time, please remove the batteries to prevent damage to the controller.
6. The operation of the controller should be within its receivable range 33' (10 meters)
7. If the controller doesn't work after the batteries have been replaced, remove the back cover and press the "ACL" button to reset the controller.

TROUBLESHOOTING

FAULT	POSSIBLE REASON	CORRECTION
Will not start	A/C circuit breaker is off	Turn circuit breaker on at ship's panel, See control operation section in this manual.
	Display control is not turned on.	Check wiring Diagram and correct if necessary.
	Incorrect wiring at terminal strip.	Disconnect power supply and open electric box, check wiring diagram, correct if necessary,
	Push-on butt connectors pulled apart during installation.	Check power source (shore/generator) for proper voltage.
	Input line voltage is insufficient,	Check wiring and terminals for proper sizes and connections.
Fan not running.	Check your specific control Troubleshooting section	
No cooling or heating	Temperature set point is above (in cooling) or below (in heating) ambient temperature	Lower or raise set point.
	Obstructed seawater flow.	Clean seawater strainer. Check for obstructions at speed scoop thru-hull inlet. Check for a good steady flow from the overboard discharge.
	Seawater pump maybe air-locked,	Remove hose from pump discharge to purge air from line
	Loss refrigerant gas.	Check a/c unit for refrigerant oil leakage, call service technician.
	Seawater temperature too high for cooling or too low for heating.	Seawater temperature will directly affect a/c unit's efficiency. This a/c unit can effectively cool your boat in water temperature up to 90°F and heat (if reverse cycle option is installed) in water as low as 40°F.
	Coil is iced (in cooling)	See below
	Fan is not running.	See below
Pressure switch or thermal overload opened.	Check you specific control troubleshooting section.	
No Heating	Unit is "cool only", or stuck in reverse cycle. Reversing valve may be stuck.	Tap reversing valve lightly with rubber mallet while unit is in heat mode, Call for service if that does not correct the problem

Continued:

FAULT	POSSIBLE REASON	CORRECTION
Low air flow	Air flow is blocked	Remove any obstructions in return air stream, Clean return air filter and grille. Check for crushed or restricted ducting, ducting must be as straight, smooth and taut as possible.
	Coil is iced	See below.
Coil is iced	Thermostat set point is too low	Raise set point.
	Improper air flow	Remove any obstructions in return air stream. Clean return air filter and grille. Check for crushed or restricted ducting, ducting must be as straight, smooth and taut as possible.
	Supply air is short-cycling,	Redirect supply air so that is not blowing into the return air stream. Seal any air leaks on duct.
	Seawater temperature is below 40°F	Shut down system to prevent damage to condenser. Allow coil to defrost (see below).
	Humidity level too high.	Close hatches and doors.
	When all else fails.	Switch a/c to heat until ice melts or use hair dryer to melt.
	Check your specific control troubleshooting section,	
System runs continuously.	Set point temperature is improperly set: too low for cooling or too high for heating.	Raise or lower set point.
	Porthole or hatches open.	Close all port holes and hatches,
	Seawater temperature too high for cooling or too low for heating.	Seawater temperature will directly affect the a/c unit's efficiency. This a/c unit can effectively cool your boat in water temperatures up to 90°F and heat (if reverse cycle option is installed) in water as low as 40°F.
	Improper air sensor location.	Check your specific control troubleshooting section,
Display panel is not lit.	4-pin display cable plugs are not making contact (unplugged, dirty, bent, or broken pins).	With POWER OFF at the circuit breaker, remove connector and inspect. If damaged, replace connector or entire display cable.

MAINTENANCE

REVERSING VALVES

Reverse cycle units have a reversing valve; the valve must be energized periodically to keep the internal parts moving freely. To do this, switch the a/c unit into heat for a few seconds once a month.

SEAWATER STRAINER

Ensure that your pump receives adequate seawater flow by regularly cleaning the strainer basket. Periodically check the overboard discharge for a steady stream of water. Check seawater intake speed scoop for obstructions. Make sure hoses are not looped, kinked or crushed.

BLOWERS

Oil blowers every six months with SAE20 or equivalent. This does not apply to high velocity blowers with the motor encased in the blower housing.

CONDENSER COIL CLEANING

1. With the system turned off at the circuit breaker on the ship's panel, disconnect the inlet and outlet connections of the condenser coil.
2. Use chemical resistant hoses (PVC 5/8" I.D., etc.) to connect the inlet of the condenser coil to the outlet of a chemical resistant, submersible pump and let the hose connected to the Coil outlet flow freely into the container mentioned below.
3. Place a strainer or piece of screen over the inlet of the pump and submerge the pump into a container filled with a 5% solution of muriatic or hydrochloric acid and fresh water or use a premixed over-the-counter solution. Use a large container as possible to hold the solution (5-25 gallons). CAUTION: avoid spilling or splashing the solution. Remember to wear all necessary protective gear, i.e. approved safety goggles and chemical resistant gloves. Follow all warnings and recommendations given by the manufacturer of any acids or premixed solutions.
4. Power the pump and circulate the solution through the condenser coil for 15-45 minutes depending upon the size of the coils and the extent of the contamination. Visual inspection of the solution in the container should indicate when the contamination has been removed.
5. Circulate fresh water through the coil to flush any residual acid from the system.
6. Restart the system and check operational parameters to ensure thorough cleaning has taken place. Additional cleaning may be necessary with extreme contamination.



For the purpose of protecting the environment, dispose of any contaminated acid solutions in accordance with federal, state and/or local regulations.

RETURN AIR FILTERS

Check the return air filter about once a month and clean as necessary. To clean the filter, remove it from the unit, rinse with water, air dry and reinstall. (Do not use compressed air)

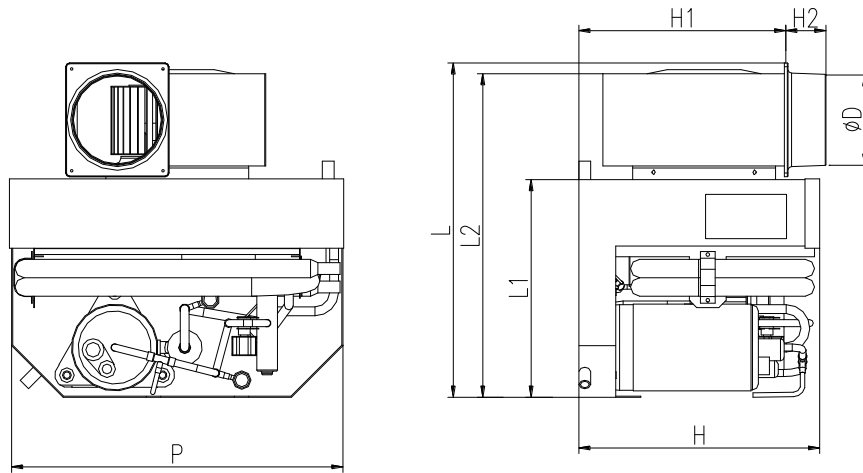
WINTERIZATION

There are several methods of winterization, some of which work better than others. There are various methods employed using a 50/50 non-polluting biodegradable anti-freeze/water solution. Any method that causes the anti-freeze solution to flow downward is the method of choice. By this, the anti-freeze solution will displace any water trapped and eliminate the possibility of freezing in hidden areas. In addition, since the seawater pump utilizes a magnetically driven impeller, the impeller should be removed from the wet end assembly, Wiped with a solution, and stored in a warm, dry area until commissioning takes place.



Collect all discharged liquids and recycle or dispose of in a proper manner.

Unit Dimensions & Technical Specifications



Unit Dimensions & Technical Specifications				
BTU Capacity	5000	9000	12000	16000
Capacity in kW	1.5	2.6	3.5	4.6
Voltage	115V/230V	115V/230V	115V/230V	115V/230V
Frequency	60Hz	60Hz	60Hz	60Hz
Aver. Load Amps	4.8A/2.2A	7.2A/3.5A	9.8A/4.6A	10.5A/5.6A
Starting surge	13A/6A	19A/9A	26A/13A	28A/15A
Refrigerant	R22	R22	R22	R22
Net Weight	24kg	27kg	33kg	34kg
Shipping weight	28kg	32kg	38.5kg	39.5kg
Blower Output	350/300m ³ /h	450m ³ /h	550m ³ /h	750m ³ /h
Dia. Cupro	16mm	16mm	16mm	16mm
H(mm)	295	310	330	330
H1(mm)	260	260	290	290
H2(mm)	54	54	54	54
P(mm)	285	380	380	450
D(mm)	100	100	125	125
L(mm)	408	408	438	454
L1(mm)	280	280	280	295
L2(mm)	380	395	410	440
Suggest Breaker	16A/16A	25A/16A	32A/16A	40A/16A

NOTE: The data is subject to change without notice; please refer to the data on the nameplate.

LIMITED WARRANTY

This product comes with a 24 month limited warranty from the date of purchase. To obtain warranty service, contact a customer service representative at: (800) 860-7866 or e-mail at: info@webasto-us.com.

TECHNICAL ASSISTANCE

If you require help, check our technical assistance website at <http://www.techwebasto.com> or call the technical support hotline at (800) 860-7866.

For quick service, please have the following information available:

- Full Name
- Phone number including the area code
- Unit Model Information
- The type of assistance you are requesting

Notes:



Webasto Product N.A., Inc.

Technical Assistance Hotline

Phone: (800) 860-7866

Outside U.S. (810) 593-6000

www.webasto.us

www.techwebasto.com